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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,505	07/06/2006	Shahab Jahromi	BHD-4662-138	9555
23117 7590 10/06/2008 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER JOHNSON, CONNIE P	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 10/06/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/565,505	<b>Applicant(s)</b> JAHROMI ET AL.	
	<b>Examiner</b> CONNIE P. JOHNSON	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/23/2006</u> .                                               | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of group II, claim 15-16 in the reply filed on 7/15/2008 is acknowledged. Claims 1-14 are withdrawn as non-elected claims and claims 17-32 are new.

***Claim Status***

2. Claims 15-32 are presented.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 15-16, 20-24 and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bae et al., U.S. Patent Publication No. 2004/0038150 A1 in view of Suwa et al., U.S. Patent No. 6,191,429 B1.
5. Bae teaches a method of making a photoresist composition for relief images comprising (page 6, [0065-0070]):

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- a. applying the photoresist composition to a substrate,
- b. imagewise exposing the composition at 193nm,
- c. developing the exposed composition,
- d. subjecting the composition to chemical etching and
- e. removing (stripping) the resist from the substrate.

The method may be used for positive or negative compositions, thereby removing the exposed or unexposed portions of the photoresist composition (page 2, [0018]). Bae teaches the same steps as instantly claimed in the immersion lithography method. The photoresist composition may comprise more than one polymer. The composition comprises a photoacid generator (page 5, [0054]) and a polymer resin with a fluorinated group (page 3, [0038]). The polymer resin comprises also comprises photoacid labile groups, such as ester or acetal groups (page 3, [0031]). The acetal and ester groups are blocking groups as in claim 28. In example 7, Bae teaches that the fluorinated resin may be present in an amount of 6 to 80% by weight, based on the amounts of the components in the composition (page 8, [0091]). The composition also comprises a surfactant (R08) in example 7. The surfactant R08 is a fluorinated surfactant by Dainippon and meets the limitations of the fluor containing compound. Bae also teaches the resin comprises hydroxyl naphthyl groups which are hydroxyl groups bound to an aromatic compound (page 2, [0022]). The resin also comprises acrylate and methacrylate polymers (page 3, [0031]). Bae does not teach that the process is used to form an etched layer in a chip in immersion lithography.

However, Suwa teaches an immersion exposure method for processing semiconductor chips (col. 1, lines 25-30). Although Suwa does not specifically show the instantly claimed steps, Bae shows these same conventional lithography steps that are used. It would have been obvious to one of ordinary skill in the art to use an immersion exposure process in the method of Bae because the process of immersion exposure improves resolution in the photoresist composition (col. 2, lines 42-47 and col. 3, lines 1-5).

6. Claims 15, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bae et al., U.S. Patent Publication No. 2004/0038150 A1 in view of Suwa et al., U.S. Patent No. 6,191,429 B1 and further in view of Houlihan et al., U.S. Patent No. 5,998,099.

Bae teaches a method of making a photoresist composition for relief images as relied upon above. Suwa, in analogous art, teaches that the immersion lithography process is used to make a semiconductor chip (col. 1, lines 25-30). The composition comprises a polymer resin with photoacid labile groups, such as ester or acetal groups (page 3, [0031]). Bae nor Suwa teach a compound that has a pKa of less than 12 when unblocked in the photoresist composition.

However, Houlihan teaches a lithography process for resist compositions. The composition comprises a polymer with acid-labile substituents pendent thereto and a photoacid generator wherein the acid generated has a pKa of 0 to 6 (col. 2, lines 46-60). The pendent groups of the polymer comprise acetal and ester groups (col. 6, lines 66-

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67). Houlihan also teaches that an acid compound with a pKa of 0 to 6 is used in the resist composition to effectively remove the acid labile (protecting groups) from the polymer (col. 10, lines 41-42). Therefore, it would have been obvious to one of ordinary skill in the art to use an acid compound wherein the pKa is 0 to 6 in the composition of Bae to efficiently cleave the acid labile groups of the fluorinated polymer as taught by Houlihan.

7. Claims 16, 18, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bae et al., U.S. Patent Publication No. 2004/0038150 A1 in view of Suwa et al., U.S. Patent No. 6,191,429 B1 and further in view of Berger et al., U.S. Patent Publication No. 2004/0033436 A1.

Bae teaches a lithography method of making a photoresist composition. The composition comprises a polymer resin with photoacid labile groups, such as ester or acetal groups (page 3, [0031]). Bae does not teach that the binder in the composition is a polymer with acid groups having a pKa less than 12.

However, Berger teaches a photoresist composition for microlithography (abstract). The composition comprises a fluorinated polymer with acidic groups that may be protected by acid-labile groups and a photoactive component (page 2, [0020-0021] and page 5, [0060]). The acidic groups may comprise carboxylic acids, phenols and fluoroalcohols with a pKa of less than 9 (page 5, [0060]). The fluorinated polymer may comprise two or more acidic groups wherein  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  may independently represent a carboxylic acid or ester (page 4, [0049-0050]). It would have been obvious to one of ordinary skill in the art to use the fluorinated polymer with a pKa of less than 9

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in the composition of Bae because Berger teaches that fluorinated polymers with sufficient acid groups, such as fluoroalcohol groups and/or protected acid groups, are partially deprotected upon exposure to render the photoresist processable in aqueous alkaline developer (page 8, [0092]).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CONNIE P. JOHNSON whose telephone number is (571)272-7758. The examiner can normally be reached on 7:30am-4:00pm Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Connie P. Johnson

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Examiner  
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/Cynthia H Kelly/  
Supervisory Patent Examiner, Art Unit 1795